August 1987 Volume 8, Number 5

Soil and Water Conservation News

United States Department of Agriculture
Soil Conservation Service

Soil and Water Conservation News is the official magazine of the Soil Conservation Service. The Secretary of Agriculture has determined that publication of this periodical is necessary in the transaction of public business required by law of this Department. Use of funds for printing *Soil and Water Conservation News* has been approved by the Director of the Office of Management and Budget. *Soil and Water Conservation News* (ISSN–0199–9060) is published 12 times a year. Postage paid at Washington, D.C.

Magazine inquiries
Send inquiries to: The Editor, *Soil and Water Conservation News*, Public Information Division, Soil Conservation Service, U.S. Department of Agriculture, P.O. Box 2890, Washington, D.C. 20013–2890.

Subscriptions
Send subscription orders to:
Superintendent of Documents
U.S. Government Printing Office
Washington, D.C. 20402

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From the SCS Chief

Cover: Side-wheel-roll sprinkler irrigates small grain crop near Townsend, Mont. (Photo by Ron Nichols, photographer, SCS, Washington, D.C.)

Managing Irrigation Systems

Farmers and ranchers across the Nation are finding that managing irrigation water more efficiently and conserving dryland soil moisture make good sense.

Efficient use of water is paramount in irrigated agriculture. In the chronically dry regions of the West, where most of the irrigation takes place, greater efficiency in the use of water helps producers cope with higher pumping costs and growing competition from nonagricultural water users.

Studies by the Soil Conservation Service indicate that irrigation efficiency increased 6 percent between 1975 and 1982. Responsible for much of this increase are improvements in water conveyance systems and onfarm distribution and application systems, plus improvements in irrigation management.

We're looking for further improvements in these technologies and for a better understanding of how moisture stress and crop production are related. For dryland as well as irrigated farming, researchers are finding crop cultivars that use water more efficiently and are less sensitive to periods of moisture stress. They are also researching crop sequencing for water conservation and improved production, the effects of water table levels on crop response, and improved methods of capturing and storing precipitation in the soil profile.

We know that proper irrigation management helps keep water clean and in adequate supply. Good management reduces soil erosion that carries sediment, nutrients, and pesticides into surface water. And it reduces the movement of salts and other soluble pollutants into ground and surface water.

We still have a lot to learn, however, about the combined effects of irrigation management practices and other practices that make up resource management systems. We need comprehensive research and applications technology to quantify those effects and to make practical use of that knowledge.

Estimating the amount of water that can be conserved by major conservation practices, individually or in combination, over broad regions is now possible with a method SCS helped develop. This method applies mainly to the subhumid to arid regions of the country; it can be extended, with additional work, to the rest of the United States. But, we're now just learning how we might use this method on individual farms and ranches.

Irrigation managers today make complex choices, often involving tradeoffs in erosion control, water conservation, and water quality protection. It will take the continuing teamwork of water-supply forecasters, conservation professionals, and researchers to help them make those tough decisions.

Richard E. Lyng
Secretary of Agriculture

Wilson Scaling, Chief
Soil Conservation Service

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Editor, Nancy M. Garlitz

Associate Editor, Paul D. Barker

Editorial Assistant, Ann P. Serota

Design Consultant, Christopher Lozos

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It's Downhill From Here

Irrigation is no longer an uphill struggle for farmers in Montana's Bitterroot Valley. Their new irrigation system lets gravity do the work.

The new system replaces 38 miles of open ditches with 28 miles of buried pipeline. With the installation of the last of five pipelines this spring, 170 farmers in the valley's Three Mile area completely switched the irrigation of 4,700 acres of mostly irrigated hayland from an inefficient open-ditch system to gravity-operated sprinklers.

According to the U.S. Department of Agriculture's Soil Conservation Service, a third of the water leaving the main canal under the old system never reached the field. Saving this amount of water—about 4,000 acre-feet annually—will be especially useful in dry years.

The project was begun in 1982 by the Bitterroot Irrigation District and the Bitter Root Resource Conservation and Development (RC&D) Area. Farmers were able to begin using the new system as the pipelines were installed.

Loren Brubaker, a member of the irrigation district's board, has been using one of the lines to irrigate his 100-acre farm for 3 years. The new system has saved him water and given him a better handle on water use.

Brubaker sees another advantage to the buried pipeline. "As the ditches were filled in and farmed," he said, "the chores of ditch cleaning and headgate repair disappeared."

Farmers previously pumped water to irrigate about 70 percent of the land. "With the elimination of the pumps, pump maintenance is a thing of the past," Brubaker said. "No more trips are needed to restart pumps because of low water in the ditch or electrical storms shutting off the pumps."

Another advantage is cleaner water. "The irrigation water is now cleaner because of screening devices installed in the main canal at the pipeline inlets," he said. "With cleaner water, there are fewer sprinkler heads to unplug."

The water comes from Lake Como and flows through 70 miles of canal before entering the gravity lines. The lines range from 26 to 3 inches in diameter and are buried 30 inches below the soil surface.

The pipelines at the main canal are about 400 feet above the valley floor. After about 100 feet of vertical drop, there is enough pressure in the lines to begin sprinkler irrigating. The pressure at the sprinklers ranges from 40 to 80 pounds per square inch.

Brubaker and other farmers in the area now have much better control of their water. With better water control, they can improve the efficiency of their operations and make waste water a thing of the past. If the water isn't needed on the fields, it stays in the main canal.

The project cost $2.1 million and was financed by the irrigation district through a loan from the Montana Coal Tax Fund and cost sharing from SCS through the Bitter Root RC&D. Another sponsor was the Bitterroot Conservation District. Engineering assistance and planning for the project was provided by SCS and the Bitter Root RC&D.

Pat Vaughan,
civil engineering technician, SCS, Hamilton, Mont.

Jerry Hudson, a ditch rider for the Bitterroot Irrigation District, cleans sticks, leaves, moss, and other debris from screens on one of the inlet structures of Montana's Three Mile Irrigation Project. Water entering the system here is used to irrigate 4,700 acres.

Have Irrigation Lab, Will Travel

Irrigation system under the weather? If you live in California's Coachella Valley there's an irrigation lab that makes house calls.

The Coachella Valley Resource Conservation District uses a mobile lab staffed with two irrigation specialists to conduct on-site evaluations of irrigation systems. The irrigation specialists evaluate the systems and suggest modifications in design, operation, maintenance, or scheduling to save water and energy.

The district first used the mobile lab in 1986 on a 30-acre date garden irrigated by water pumped from a well into a drip irrigation system. The water was filtered through a tubular screen filter, pressure regulated, and delivered through underground pipes to each palm tree by four single-point emitters on a pigtail encircling the tree, or a single multiple-outlet spaghetti hose with tubing around the base of the tree.

The irrigation specialists measured the distribution uniformity (DU), or the system's ability to deliver the same amount of water to each tree. The system was measured at 63 percent, which is poor according to standards of the Soil Conservation Service. The crew also found the lateral flush water dirty and a number of pigtails broken or leaky from being cut and dragged by cultivation implements. They concluded that the poor DU was caused by the use of different types of emitters, leakage, and partially clogged lateral lines and emitters.

To ensure that all the trees received adequate water, the operator had extended the irrigation applications. As a result, the trees already receiving adequate water were being overirrigated and what should have been the garden's annual requirement of 247 acre-feet of water was being exceeded by more than 146 acre-feet.

The irrigation specialists made four suggestions to the operator: (1) adjust the irrigation control clock more frequently to match water consumption rates, (2) convert the remaining spaghetti emitters to single-point emitters on pigtails, (3) plug leaks, flush thoroughly, and continue regular flushing of lateral lines, and (4) harvest offshoots from the date trees and pull pigtails up against tree trunks out of the way of cultivation tools.

The operator implemented suggestions 2, 3, and 4, but requested a follow-up evaluation before adjusting the irrigation schedule as called for in the first suggestion. The lab crew re-evaluated the system in early 1987 and measured the new DU at 89 percent, which is good by SCS standards (a DU of 90 or more would have been excellent). The water pressure distribution was

uniform, the lateral flush water was clean, and only two minor leaks could be found.

After the follow-up evaluation, the operator adjusted the irrigation schedule to more closely match the plant water consumption rate. The system now uses 115 acre-feet less water per year, which is a 46 percent reduction in water use.

Thus far, the district has used the mobile lab to help about 90 irrigators bring their ailing irrigation systems back up to par. Whether the systems are agricultural, such as those for citrus, date, and grape crops, or nonagricultural, such as those for golf courses and parks, the healthy systems are producing substantial savings in water and energy.

Donald R. Ackley,
irrigation specialist, Coachella Valley Resource Conservation District, Coachella, Calif.

Donald Ackley, irrigation specialist with the Coachella Valley Resource Conservation District, evaluates irrigation system in date garden. One goal is to match the irrigation schedule with the needs of the crop, above.

Irrigation Study Shows Need for Improvement

"On the average, farmers were applying 10 inches of irrigation water when only 2 inches of water could be stored in the root zone," said Mark Zuber, Soil Conservation Service agricultural engineer in Chinook, Mont. "That means that the other 8 inches of water either ran off the field or percolated past the root zone."

This and other information on the efficiency of flood irrigation systems in Blaine County, Mont., came from a 1986 study of 10 graded border irrigation systems. Zuber conducted the study, and the Blaine County Conservation District (CD) financed it. Evaluations were based on an analysis of water flow rates, soil moisture, water infiltration rates, and irrigation timing using standard SCS procedures. The study showed that although water use efficiencies ranged from 2 to 36 percent, they could be improved to 29 to 64 percent with improved management at little additional cost.

The study pointed out four major factors contributing to low efficiencies: already adequate soil moisture before irrigating; borders that were either too long, too wide, or both; border dikes that were too low; and ditches overgrown with weeds and willows.

The study showed that in many cases there was already sufficient water available for plant growth when the soil was irrigated. The study also showed that borders wider than 80 feet or longer than 1,000 feet reduced efficiencies by 15 percent or more.

"Low borders just compound the problem," said Zuber. Low borders allow the water to move to adjacent fields before completely flooding the border being irrigated. "As a result, irrigation set times were longer and excess water was being applied," said Zuber.

Clean ditches could increase the water available to each border by 25 to 50 percent. With more water going to the borders, the set times could be shorter.

The studied irrigation systems are on major soil types in the Milk River Valley, and study results apply to much of the irrigated land in Montana's Ft. Belknap, Paradise, Alfalfa, and Zurich Irrigation Districts.

Besides analyzing the existing systems, the study looked at how the systems could be improved. One scenario for improvement calls for primarily management changes. It involves adjusting irrigation times, irrigating at the right time, and installing higher border dikes.

"On a 120-acre irrigated farm, these changes would save the irrigator 7 days and 40 acre-feet of water with each irrigation," said Zuber. "The Paradise Irrigation District, for example, could save over 2,700 acre-feet of water every irrigation if every irrigator made these changes." That's a water savings of 40 percent throughout the irrigation system.

The second scenario involves reducing border widths and cleaning the existing ditches in addition to making the changes in the first scenario. "This second scenario closely approaches the ideal irrigation situation," said Zuber. "If these changes were made on every farm in the Paradise Irrigation District, 54 percent less water would be used for the season—a savings of over 3,600 acre-feet.

"The increases in efficiencies are based on assumptions that may not be possible to duplicate in real life," said Zuber. "For example, some of the increased efficiency comes from irrigating at precisely the right time. That just isn't possible every time. Canals often have to be shut down to control moss or pass water through to downstream users.

"This study does give us a good reference point on the current efficiency of area irrigation systems and what changes irrigators could make to improve their irrigation systems."

Results of the study were published in the CD's newsletter and in local newspapers. This has helped to make more irrigators aware of the kinds of changes that can make their systems more efficient. The SCS staff in Chinook reports that more farmers have been asking for technical assistance in better scheduling of irrigations and reshaping irrigation borders.

Harold S. Cottet, Jr.,
district conservationist, SCS, Chinook, Mont.

New Valve to Improve Rice Irrigation

"Necessity is the mother of invention," an old saying goes, and it is ringing true in Texas. A team there has invented a new kind of valve to help irrigators conserve water, energy, and labor on rice fields.

Ronnie Skala, a Soil Conservation Service civil engineer; Garry McCauley, an associate professor at the Beaumont, Tex., Agricultural Experiment Station; and David Adkins and Mark Ebling, two agricultural engineering students at Texas A&M University, are applying for a patent on an automatic irrigation valve that they invented. The valve is designed to maintain the correct level of water in each border, or cut, despite fluctuations caused by evaporation into the air, percolation into the soil, and evapotranspiration of the flooded rice crop.

The Texas Rice Belt produces 15 percent of the U.S. rice supply. Rice is flush irrigated for the first 30 to 35 days of its growing season and flooded for another 70 to 80 days. The field is then drained just before harvest. The total energy required to grow an acre of rice using ground water for irrigation is approximately 120 gallons of diesel fuel, and for using surface water for irrigation it is about 50 gallons of diesel.

The Texas Agricultural Experiment Station, Texas A&M University, the Texas Rice Research Foundation, local soil and water conservation districts, and SCS began an in-depth study of water use and management practices, soil water behavior, and irrigation field lateral losses in rice fields throughout the Texas Rice Belt in 1982.

At the beginning of the 1986 fall semester, Skala presented an actual field problem to a senior agricultural engineering design class at Texas A&M University. Skala challenged the students to design a low cost, automatic irrigation valve that would use water efficiently and eliminate the strenuous labor involved in flood irrigating rice.

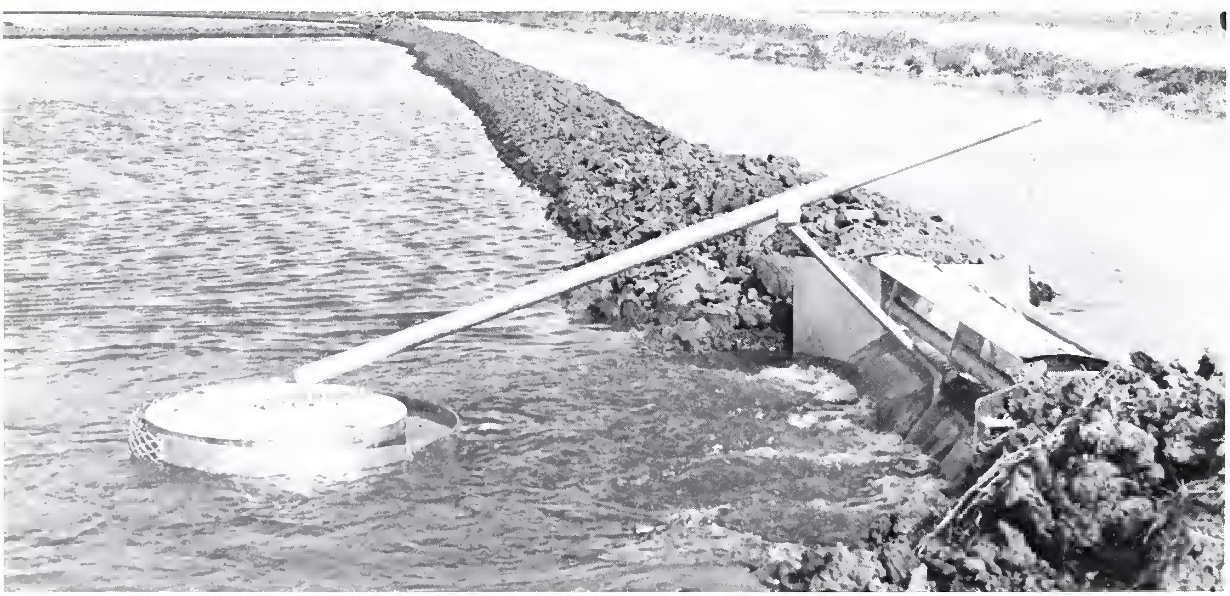
Rice fields have borders that hold water by means of levees. Water is released into a border by means of a water box. Once the first border is filled to its capacity, the excess water is allowed to flow, by means of another water box, into an adjacent border at a lower level and continues until all the borders are full. This is a labor-intensive process that is carried out daily over the 3- to 4-month growing season of rice. This system has to be under constant supervision since the flow into the border is continually changing.

Using the automatic valve, the flow of water into the border is provided by a canal, instead of by excess flow from an upper border. The water level in each border can then be individually controlled at the canal, instead of being a function of the water height in the border above it. This method will help to conserve water because only the amount of water needed would be added.

Instant water and more control by the producer is possible when the outlet valve of an underground pipeline is located in the irrigated field. This increased control saves water and reduces runoff. Data shows that runoff varies from 6 to 35 inches. If this water is purchased by volume or pumped, the possible savings would be \$12 to \$70 per acre.

The manual method of rice irrigation also tends to waste rainwater because all borders are maintained at their maximum depth, leaving no storage area and allowing rainwater to be lost as runoff. The new automatic rice irrigation valve can reduce water use in rice fields and save labor costs to producers.

Kim M. Berry,
clerk-typist in the Stay-in-School Program, SCS, Washington, D.C.



Irrigation valve lets water from canal flow into rice border. The valve enables rice irrigators to use less water and labor to irrigate and increase yields.

Time to Irrigate? Check the Atmometer

Look at an individual plant and you may or may not be able to tell if the crop needs irrigating. Look at the atmometer right next to the plant and you can tell in a glance.

A new, modified atmometer is helping to simplify irrigation water management for farmers in Longmont, Colo. The atmometer is placed alongside the plants in a crop field, where it is exposed to the sun and wind. It is equipped with a sight glass that reveals crop water loss in inches the way a rain gauge measures precipitation.

"Using an atmometer enables farmers to see how the amount of water their present method of irrigating delivers to the crop compares with what the crop actually uses," said Jim Anderson, a farmer helping to test the new device. "The atmometer enables us to track water use on a daily basis. We use it to help time our irrigations."

The atmometer has a porous ceramic plate covered by green canvas. The plate is attached to a bottle that is filled with water when the field is irrigated. The water is drawn up from the bottle as it evaporates from the green canvas surface. The amount of water evaporated from the atmometer then indicates the amount of water used in the crop field.

For the past year, the Soil Conservation Service staff in Longmont has been testing the new atmometer, which was designed by Jon Altenhofen with the Northern Colorado Water Conservancy District. "We wanted to provide local irrigators with a simple, inexpensive onfarm management tool that they would put into long-term use,"said Dawn Genes, district conservationist with SCS's Longmont field office. "We wanted something that would show farmers how much irrigation water is used through evapotranspiration."

"Initially, we knew we wanted to do some kind of irrigation scheduling with farmers," said Paul Gallegos, an SCS engineering technician. "Gypsum blocks were too time consuming, and the readings were sporadic. All the farmer has to do with the atmometer is set it out and look at it."

The Longmont Soil Conservation District purchased five atmometers, which cost about $50 apiece, and set them up on farms, mostly in irrigated cornfields. "The farmers were skeptical at first," said Genes. "But after the first year of testing, they are all very happy with it."

The SCS staff verified the atmometer readings with measurements obtained with more sophisticated tensiometers and soil probes. "We were seeing that farmers were overwatering, saturating the soil profile," said Gallegos. "They could irrigate 4 to 5 days just on bonus water."

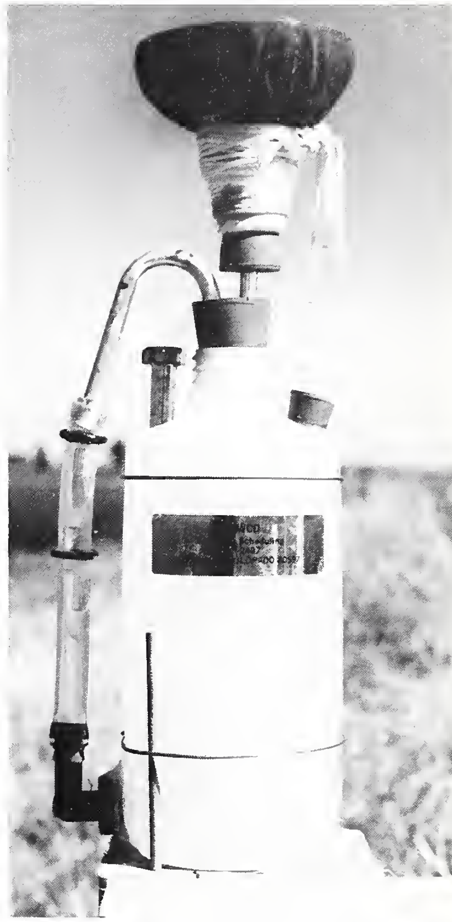
Overwatering can cause almost as many problems as underwatering. Too much water can leach fertilizer down below the root zone, can decrease yields because of waterlogged or oxygen-deficient soil, and can delay the dry down process of maturing corn. Watering too early in the year can reduce the heating-degree days, slowing plant growth, as it takes more energy to heat wet soil than drier soil.

"The atmometer was especially helpful for us late in the year. It helped support our decision not to irrigate one last time. Normally, we would have irrigated to be safe," said Luke Stromquist, another participating farmer. "The atmometer would be very valuable for sprinklers, where overirrigating directly costs the farmer." In general, the more costly delivery systems benefit the most from improved irrigation scheduling.

Crops use water by evapotranspiration, which includes evaporation from the soil and transpiration of the plants. Although the atmometer works only by evaporation, it is designed so that it indicates the water loss through both evaporation and transpiration to give a complete picture of the crop's water loss in the field.

The location of the atmometer in the field has been found to make a big difference in the rate of evaporation. The size of the bottle can also affect readings. Still, even with the bugs to be worked out, it is giving farmers more than their instinct to follow. "We will definitely be using it more in the future," said Genes. "Not only is it helping the farmers, it is also improving our understanding of irrigation and evapotranspiration."

Lorraine Henley,
area public affairs specialist, SCS, Greeley, Colo.



The atmometer is filled with water when the crop is irrigated. Exposed to the sun and wind, it then loses the water at approximately the same rate as water is used by the crop. The sight gauge on the side of the device indicates how much water has been used so that the farmer will know when to irrigate.

Basin Irrigation: One Farmer's Answer

Vern Allred's 420-acre farm near Phoenix, Ariz., is no longer the same operation. In 6 years, it has become a model of irrigation efficiency.

When Allred bought his farm in 1981, it was inefficient and difficult to irrigate. Irrigation efficiency was about 30 percent, which meant that his alfalfa, cotton, and small grain crops got less than a third of the water he applied. It took five employees about 2 weeks to irrigate the farm. But Allred has since installed a new irrigation system that has changed all of this.

"There were some big obstacles to overcome," said Allred. "We had no way to efficiently apply irrigation water. This farm was organized to irrigate from one ditch that ran through the center of the farm. Irrigators had to walk up to a half mile to adjust irrigation sets. That meant that any changes to our management scheme would also increase our labor costs."

Allred discussed his problems with technicians from the Soil Conservation Service of the U.S. Department of Agriculture (USDA) and asked for their suggestions.

"We did some detailed irrigation studies with Vern and developed an analysis of various irrigation systems that could be placed on his farm," said Lloyd Nelson, soil conservation technician with SCS's Phoenix field office. The recommendations varied from improving the old irrigation system, which was a combination graded border and graded furrow system, to installing a level basin irrigation system on one or two fields.

Allred tried the level basin system on 95 acres and was so impressed with the improvement it made that he decided to apply it to his entire farm. He worked closely with SCS to develop a plan to accomplish this goal and applied for cost-sharing assistance from USDA's Agricultural Stabilization and Conservation Service.

"I was so eager to reap the water savings that I decided to go ahead and put this irrigation system on the rest of my farm. I soon learned that the change in irrigation system created a need to train our irrigators. SCS also helped us accomplish this," said Allred.

The plan called for leveling the land, installing 3 miles of concrete-lined ditch, and constructing 4 acres of field roads. The land leveling involved moving an average of 700 cubic yards of soil per acre, cutting deeper than a foot in some places and filling more than 2 feet in others. The farm's 3 fields were increased to 15 of about 20 acres each.

According to Nelson, basin systems are designed to spread water over a nearly level area as quickly as possible and then allow the water to soak into the soil. This is accomplished with short set times and large streams of water.

"Vern was accustomed to reducing the irrigation stream to the point where water travelled across the field slowly," said Nelson. "His irrigators would string out several siphon tubes across a field and run an irrigation set for 24 or 36 hours to achieve water penetration. Instead of the siphon tubes, the new system uses gravity to get the water from the ditch to the field through ports. A level basin can be irrigated in about 3 hours."

Allred's new irrigation system is about 80 percent efficient. It has helped him to conserve water and improve the efficiency of his entire operation. Water use has been cut in half, and one employee can now irrigate every acre on the farm in about a week.

Smitty Covey,
district conservationist, SCS, Phoenix, Ariz.

Vern Allred has installed a level basin irrigation system on his 420-acre farm near Phoenix, Ariz. With technical assistance from the Soil Conservation Service, the land was graded so that it can be covered with water and completely irrigated in about 3 hours.

New System Helps Dairy Manage Waste

Dan Smith is like a lot of farmers. His decision to make a major investment in conservation was preceded by a renewed commitment to farming.

Smith's farm is the largest dairy in the Green River Valley of Washington State. When his father started the dairy in 1919, the berry, truck, beef, and dairy farms in this part of King County were major suppliers of farm products to nearby Seattle and other communities of the Puget Sound region. Seattle's growth in recent years, however, has changed the face of the valley. Much of the fertile farmland has been developed for light industry and other urban uses, and few farms remain.

As Smith saw it, he had two problems. One was the increased pressure to sell his 723-acre farm for development. The second was waste management. Each year his 1,400 head of cattle produce approximately 15½ million gallons of waste. He decided to enroll his farm in a local farmland preservation program and install a new waste management system that the Soil Conservation Service had helped him plan.

Smith's old system of managing the dairy waste involved mixing it with sawdust and stacking it in his fields, where it was spread by bulldozer when weather permitted. Runoff from some of the stacks entered Mill Creek, which flows across his farm and into the Green River, which enters Puget Sound. Smith, a cooperator with the King County Conservation District, replaced this system in the summer of 1985 at a cost of $150,000. SCS provided technical assistance in planning and installing the new system and the U.S. Department of Agriculture's Agricultural Stabilization and Conservation Service provided financial assistance.

The new system has four underground tanks for temporary storage of 68,100 gallons of manure. The tanks are connected by 1,680 feet of 8-inch mainline that carries manure three times a day to a 4½-acre storage pond. From the storage pond, the manure is hauled to the fields and spread with a mobile sprinkler. The pond has a 6-month storage capacity to prevent the need to apply the manure to the fields in the rainy season. The system is controlled through a computer. Once the manure is scraped into the slots on top of the tanks, no more manual labor is required.

On days when there is no rain or when the ground is frozen, the pumps and valves can be adjusted to handle heavy slurry. When it is raining (this area receives about 45 inches of rain a year), the system can be adjusted for light slurry.

The animal waste system incorporates the latest technology for utilizing the waste as fertilizer for crop production. It is convenient, saves time, uses waste more efficiently, and makes the working atmosphere more pleasant. "The system is everything I thought it would be," said Marty Irland, the dairy manager.

Smith's decision to put his farm in the county's farmland preservation program and reinvest in his farming operation sent a clear signal to other Green River Valley farmers. If they decide to stay in farming, they will not be alone. The largest dairy in the valley will be there with them.

Mary Anderson,
conservation technician, SCS, Renton, Wash.

An underground storage tank is installed as part of the new waste management system on Dan Smith's dairy farm in the Green River Valley of Washington.

News Briefs

Mastering Conservation

Some people work and train to be master plumbers or master carpenters. In Scott County, Iowa, people are becoming Master Conservationists.

The Scott County Soil Conservation District (SCD) is sponsoring a Master Conservationist program that is involving area residents in a wide range of conservation activities. The program consists of guided study in conserving wildlife, woodlands, and wetlands and reducing drainage and erosion problems in rural and urban areas. Professional instructors are provided by the U.S. Department of Agriculture's Soil Conservation Service and Extension Service and the Iowa Department of Natural Resources.

The students, who attend class twice a week, receive a total of 40 hours of instruction and must pass a final examination to receive their Master Conservationist certificates. In exchange for their 40 hours of training, the participants volunteer 40 hours of work to the Scott SCD's soil conservation program. The work can be done in a variety of ways, such as setting up mall displays, helping to develop outdoor classroom sites, or talking to community groups.

When the program was first offered, in January 1987, 16 people signed up and 13 went on to become Master Conservationists. One graduate, Chris Reed of Buffalo, Iowa, has given tours of native grass plants and wildflowers. Another, Clarrisa Hunt of Davenport, Iowa, is planning to organize a grass and flower planting to help restore a historical site. This group has been meeting monthly since graduation to discuss topics of mutual concern, such as water quality, and to plan tours and activities.

Several Master Conservationists staffed a booth at the Iowa State University Master Gardener Spring Lawn Fair in Ames, Iowa, and also at a lawn and garden show in Davenport, Iowa. Walter Harder, a retired railroad employee from Moline, Ill., helped with the booth in Davenport. He works part time as a tutor at Adult Life in Moline, an adult education center, and has always had an interest in conservation. "I used to teach conservation to my Boy Scout groups," he said. Harder recommends the Master Conservationist program to anyone who has an interest in conservation.

Judie Izer works for a newspaper in Clinton, Iowa, and is a part-time landscape designer. She uses native grasses and wildflowers in her landscape designs and was very happy that classes in these subjects were included in the program. She said the forester, Stan Tate, and the biologist, Bob Sheets, both of the Iowa Department of Natural Resources, answered many questions she had about grasses and wildflowers. For her 40 hours of volunteer work, Izer has written a booklet, "Cultivated and Native Wildlife Plants in the Urban Landscape." The booklet includes information on landscaping with native grasses and includes illustrations.

"The course was very enjoyable," Izer said. "Sometimes the classes would last longer than 3 hours, just because everyone was so interested and kept asking questions." She was also amazed at the urban conservation work that needs to be done. "Many city people don't know how important conservation is," she said.

Izer made a banner for the Master Conservationist booth and also helped hand out material. She is enthusiastic about future projects. "We are not experts in conservation so we can't tell people what to do," she said. "But we do know and let others see that there is a need for conservation."

SCS District Conservationist Lonnie Miller teaches in the program and considers it a valuable asset. "I teach a few people about conservation programs, and they in turn do the same," he said. "Our SCS workload is heavy, and the people in this program will help us to reach more people sooner."

Jody Christiansen,
public affairs specialist, SCS, Des Moines, Iowa

Ogallala Water Level Rises

For the first time in its 36-year history, the High Plains Underground Water Conservation District in West Texas has documented an average net rise in water levels in observation wells in the Ogallala Formation throughout the district's 5.2 million-acre service area.

The net rise of more than one-half foot indicates a reverse in the trend from a decline in water levels to stabilization of the aquifer.

"The most important thing about a zero net change, such as that recorded last year, or a net rise, such as what we have this year, in the measured water levels is that the amount of water in the aquifer is not changing significantly," said Don McReynolds, director of the water district's Geohydrologic Division, in the April 1987 issue of *The Cross Section,* the district's monthly newsletter. "The aquifer is stabilizing. If we're not using the water now, it means more water will be available for future use."

McReynolds attributes the rise in measured water levels to a number of factors, including the high amounts of precipitation over parts of the district's service area in late fall of 1986 and to high fuel costs, which contributed to reduced pumpage. In addition, more efficient irrigation management and equipment such as center pivot sprinkler systems, furrow dikes, and surge valves have also helped reduce the amount of water pumped from the aquifer.

Although the districtwide average shows a net rise, the actual measured depth to water and average depths vary from county to county.

Twelve of the 15 counties served by the water district show an average annual rise in water levels from January 1986 to January 1987. These rises range from a slight 0.03 foot to a significant 3.27 feet.

The High Plains Underground Water Conservation District staff measures the depth to water in the Ogallala Aquifer annually through a network of about 950 water-level observation wells scattered throughout the service area.

Turning the Tide

Folly Beach, near Charleston, S.C., is a small resort with a big erosion problem. Like many other sparkling beaches of the southeastern United States, it has been losing ground to the sea.

Over the years, expensive projects involving hauling in and spreading sand over the beach have been tried at Folly Beach, but with little success. This year, however, thanks to more than 1,700 hay bales and a large group of volunteers, there's a new dune growing on the beach.

The volunteers staked the bales down 2 to 4 inches apart seaward of the existing dunes, in rows parallel to the ocean. The rows were placed well above the high tide line. Wave and wind action now deposit sand behind and around the bales, building a new dune.

The first 200 bales were put out early in 1986 by Explorer Boy Scouts and employees of the Soil Conservation Service. By June, 60 of the bales were almost covered by the growing young dune. By July, all of the bales were covered. A group of 50 U.S. Navy Seabees then placed 1,500 more bales on the beach.

"Once the original rows of hay bales are covered with sand," said former SCS District Conservationist Murphy Winn, who coordinated the project, "a second layer is added, and then a third, until the desired dune height is reached. The bare sand should be stabilized by planting salt-tolerant conservation plants."

Winn first used hay bales to establish dunes in 1983 farther up the coast at Pawleys Island, S.C. That project now boasts a dune 5 feet high with native vegetation rapidly becoming established.

"The bales retain water and provide organic matter in the dry, sandy conditions of the dune," Winn said, "so they greatly benefit plant growth." He said the hay bales seem to do a better job of trapping sand than the sand fences commonly used to control beach erosion. "They are also better environmentally because sand fences can fall or be knocked down and become a hazard to beachgoers and marine life."

Winn said the bales should last about 5 years, and the dune they create should last for a long time beyond that. He cautioned, however, that this method—like most other methods—would not be successful at every location and can't serve as a major wave barrier.

In all, the project at Folly Island cost about $2,600 for the hay bales, inexpensive compared to the price of seawalls and other structural measures. "The volunteer labor is what made it all possible," Winn said. "We're very grateful to the Scouts and Seabees."

The project at Folly Island was a joint effort by SCS, the Charleston Soil and Water Conservation District, and Charleston County Department of Parks, Recreation and Tourism. A brochure on dune stabilization, which explains Winn's approach, is available from the South Carolina office of the Soil Conservation Service, Public Affairs Division, 1835 Assembly Street, Room 950, Columbia, S.C. 29201.

Ann Christie,
district conservationist, SCS, Charleston, S.C.

First Conservation District Celebrates 50th Anniversary

The Nation's first soil conservation district, the Brown Creek Soil and Water Conservation District in Anson County, N.C., celebrates its 50th anniversary this month.

In 1937, to carry soil conservation beyond small demonstration areas, the U.S. Department of Agriculture (USDA) drafted a Standard State Soil Conservation Districts Act. On February 23, 1937, President Franklin D. Roosevelt declared, "Such legislation is imperative to enable farmers to take the necessary cooperative action," and forwarded the proposed act to State governors. Under the act, local communities, usually based on watersheds in the early years, could organize a district and sign a cooperative agreement with USDA. Arkansas passed the first State law.

On August 4, 1937, the Brown Creek watershed area in North Carolina, where Hugh Hammond Bennett, first chief of the Soil Conservation Service and soil conservation crusader, was born and raised, became the first soil conservation district to sign a cooperative agreement with USDA.

Of conservation districts Bennett said, "I consider the soil conservation district movement one of the most important developments in the whole history of agriculture. It has proved even more effective, I am convinced, then we had dared to expect."

Others of the nearly 3,000 conservation districts will be celebrating similar anniversaries in the months ahead.

California District Receives Grant

The Contra Costa Resource Conservation District (RCD) has been chosen as the recipient of the California Irrigation Management Information System (CIMIS) grant program. The Contra Costa RCD will receive $10,000 a year, over 2 years, to use in developing irrigation water management programs with CIMIS.

The Contra Costa RCD submitted a proposal to the statewide grant program explaining its problems with surface runoff from irrigation, raised water tables, and salt buildup in the soils. Included in the proposal was the RCD's plan for providing irrigation scheduling information and irrigation system evaluations to managers of farmland, large turf areas, parklands, landscaped public roadways, and highways to help alleviate the problems.

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